FLOWTECH™

KF700 Series

Battery electromagnetic flow meter

MF7400 USER MANUAL

NINGBO KIO FLOW INSTRUMENTS CO.,LTD

ISO9001-2000

Key Features

Leading in global the battery electromagnetflow meter converter to effectiv

ensure “measurement accuracy of Real time field te..’

Innovativthe world’s leading techngy of excitation in electromagnetic flow m

excitation circuit simple, stable and r

Firsusing fuzzy algorithm″ technoloirto ″Electromagnetiflow meter″

measurements in domestic. It ensures the converwith the performance of artif l

intelligen

In domestic first us capacitive technolc” tdetec tube empty of ful to ensure

flow meter no false alarm

In domestic first us the factory to save setti” functions to ens instrument

parameters not los.

High Resistance Rpid Response Desiging, undistorte capture weak signals and rap

response flow changes, turndown ratio of up to 10(

Low conductivity measurement capabilit

The consistency of exchangi converter to ensure withou re-examining the

parameters.

To provide sensors Zero tr functiorand automatic zeroing functi

Chinese (English) frie user interfacto satisfy many country custome

requirements

Notes on installat:

Warning:

For safety point of view of the considerations, the following points are very important, esp
symbols ofwarning signs, it should be read and understood before the system inst

• Installation, connection, communication and maintenance must be performed by qualified professional's people.

• The professional's people should be to read and understand the manual instructions and operational guidelines before system installed. And in the use of equipment, iti s very importantt o follow the instructions related operations.

• The professional's people should be training and certification by the equipment supplier.

•In the installation, It should be ensure thatt he measurement system is connected correctly according with the connection diagram.

• In the application, ift he pipeline ruptured, on-site work pressure or medium may be caused danger to people, the environment, equipment, etc. We recommend installing a special alarm system before the sensor installed, such as a special place to setup protective or installation of security devices or safety valve.

• Repair and maintenance only by the equipment manufacturer recognized by the staffto operate.

Security Statemer

Battery Power

• For safety considerations, pulse output only for equipment certification, it should be use of low-voltage standard.E2000 pulse outputi s just only functional insulation.

• High energy storage ofl ithium batteries is the main power supply. The designing is according to the highest safety point of view. However electrical or mechanical external forces might make it on the potential dangers. In most cases, such as the external heat generated to make battery bad or internal pressure may make battery rupture.
So the use ofl ithium batteries should be in operation to observe the following basic precautions:
- Do not short-circuit; repeat charging, over-charging or electrode connection error.
- Do not expose the battery exceeds the temperature oft he environment or into the fire.
- Do not squeeze, pierce, open the battery or open the battery pack.
- Do not weld the battery.
- Do not make the battery into the water.

Formula (1) the magnetic field B is constant, D is a constant, then the induced electromotive force E and the measured flow rate V is proportion. By measuring the tube cross section oft he instantaneous volume flow rate Q and the relationship between the velocities V as follows:

$$Q=\frac{\pi D^2}{4}\cdot V \qquad (2)$$

Putf ormula (1) to formula(2) ：

$$Q=\frac{\pi D^2}{4B}\cdot E=K\cdot E \qquad (3)$$

Where: K ... Instrument Constant

E is usually referred to as flow signals, flow signal input converter, the treated flow signal is proportional to the output 4 ~ 20mA current signal, Pulse (or frequency) signals. It can be recorded on the flow rate, adjust, etc..。

Performance

A sensor scope of application: (manufacturermation)

DN10 ~ DN1200

B Measuring range

0.05m / s ~ 10m / s

C the Measuring of accuracy: (sensor type related to measurement accu

0.4m / s ~ 10m / s when 0.5, 0.1m / s ~ 0.4m / s when 1

D Repeatabili

Measured value of 1 / 3

E Information Dsplay (manufacturer informati

E2000 converter: English display: instantaneous flow, flow rate, the percentage of flow, a positive net cumulat be set to reverse with alar

F output signa

1. Frequency 0 ~ 5kHz amplitude 24V Passive

2. RS485 (optional)

3. GPRS communication

G excitation mode (manufacturer informati

1) High-frequency excitati

2) Low-frequency excitati

H excitation frequency (manufacturer informa

1 / 4, 1 / 2 by setting the option

Iload resistance (manufacturer infction

Less than 100

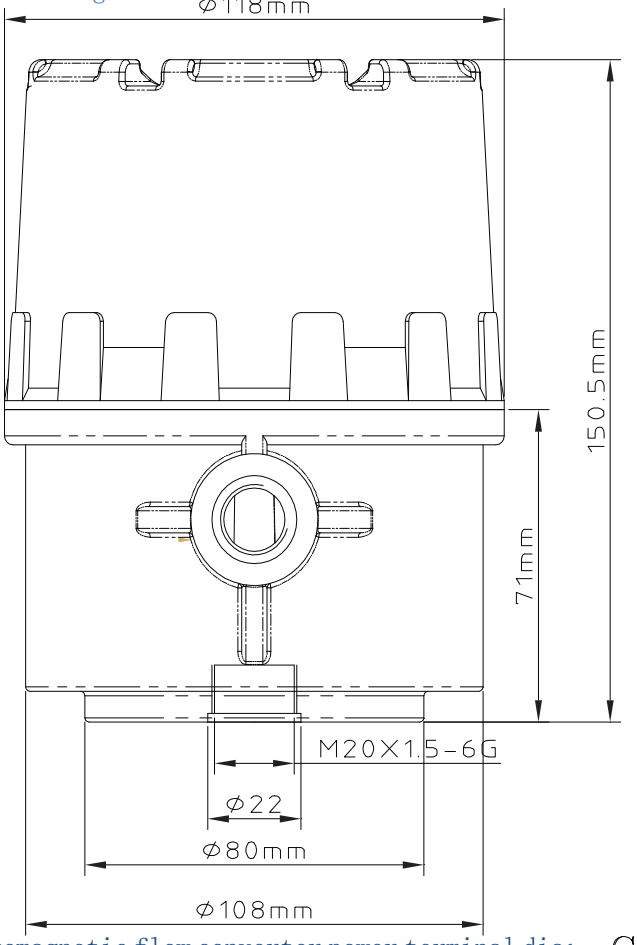
Jtime constan

0.1 ~ 99.9 seconds can be set

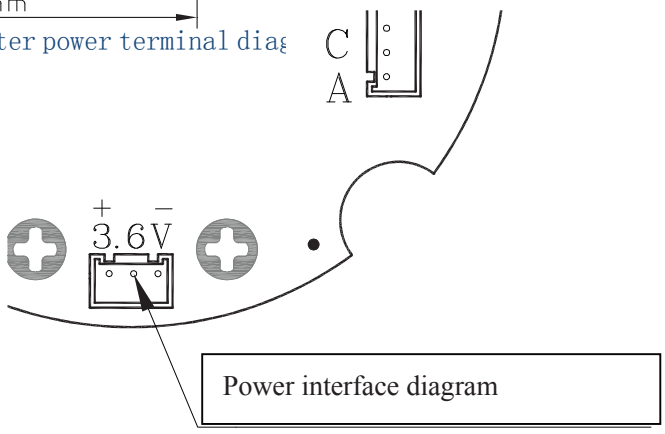
K Power Supply 3.6VDC power: less than 2mW

E2000 Series Battery electromagnetic flow converter and the terminal blocks Size De

1.1 Overall Structure Size



1. 2 E2000 Series Batterylectromagnetic flow converter power terminal diag



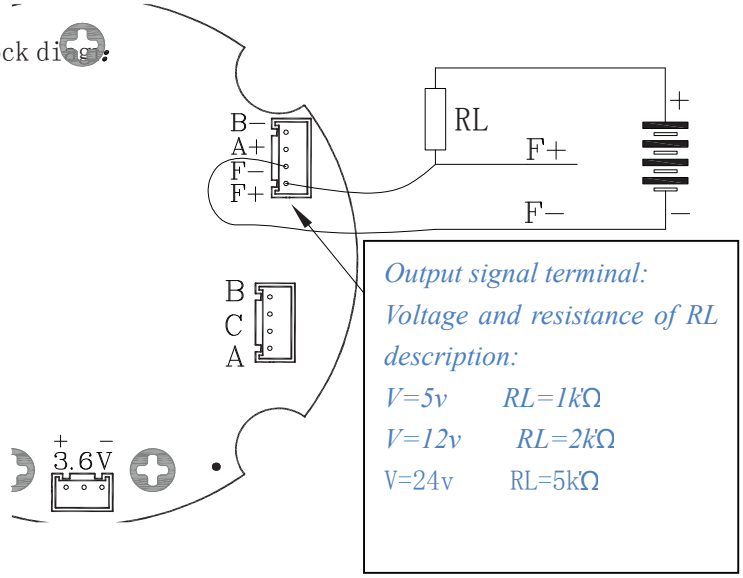
Power interface diagram

A serious warning: In the wiring connect to the power line, it should be ensure that the power absolute prohibition on Reverse polarity connect to power sup—. If the wrong wirir converters wi cause to be permanent damaged.

E2000 Series Battery electromagnetic flow conv-type power access terminal descript

No.	Mart	Function	Remark
+	+	DC 3.6v power supply +	Power +
-	-	DC 3.6vpower supply -	Power -

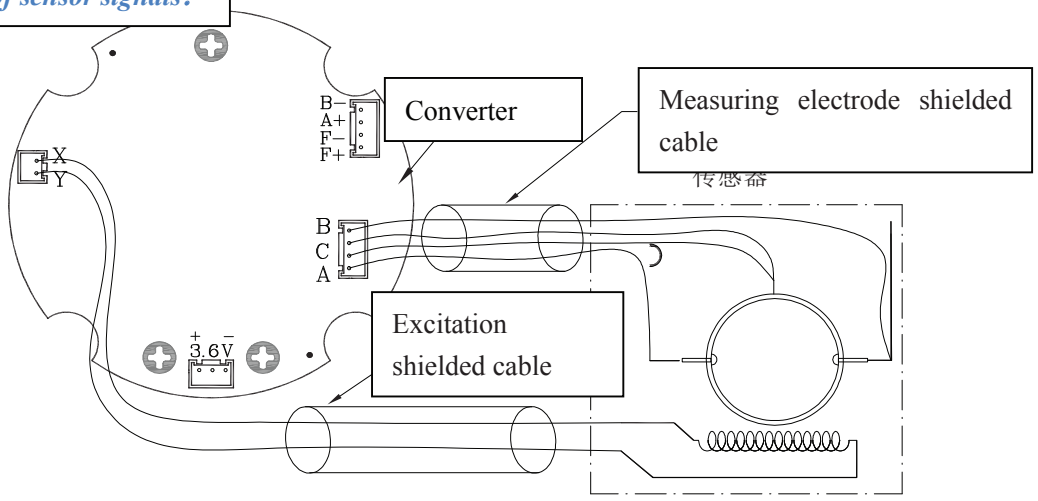
1.3 Output Signal terminal block di



Output Signal terminal descrip

No.	Mart	FUNCTION	REMARK
1	F+	Frequency or pulse output +	Frequency or pulse outputf or passive, load current ≤ 20mA
2	F-	Frequency or pulse output -	
3	A+	RS-485 Data +	
4	B-	RS-485 Data -	

1.4 Schematic diagram of sensor signals:



Warning: Access to the sensor signal, the absolute prohibition of the signal line ABC and the signal line XY mixed wiring, if there is an error in wiring, converters will cause to be damaged. !

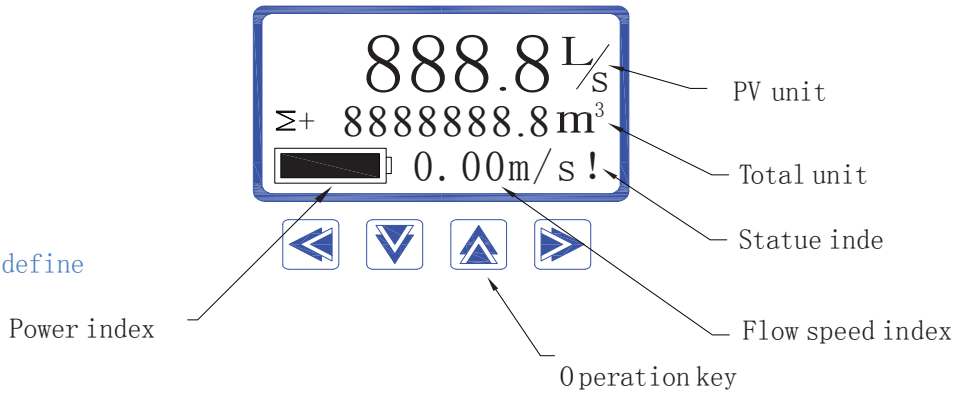
1 Wiring input and output signal line as you're power i

2 Pls note the polarity as connecting X and Y connecting ca

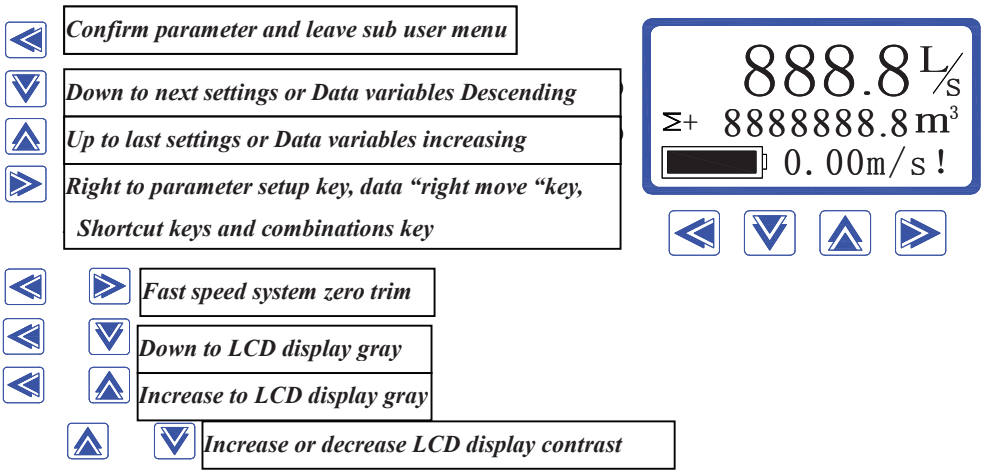
3 Pls note that the polarity of cable as measuring electrode signal cable co

No	Mart	Function	Remark
1	X	Excitation-driven X	Load resistance 10~100Ω
2	Y	Excitation-driven Y	
3	A	Input signal A	
4	C	Public input signal terminal	

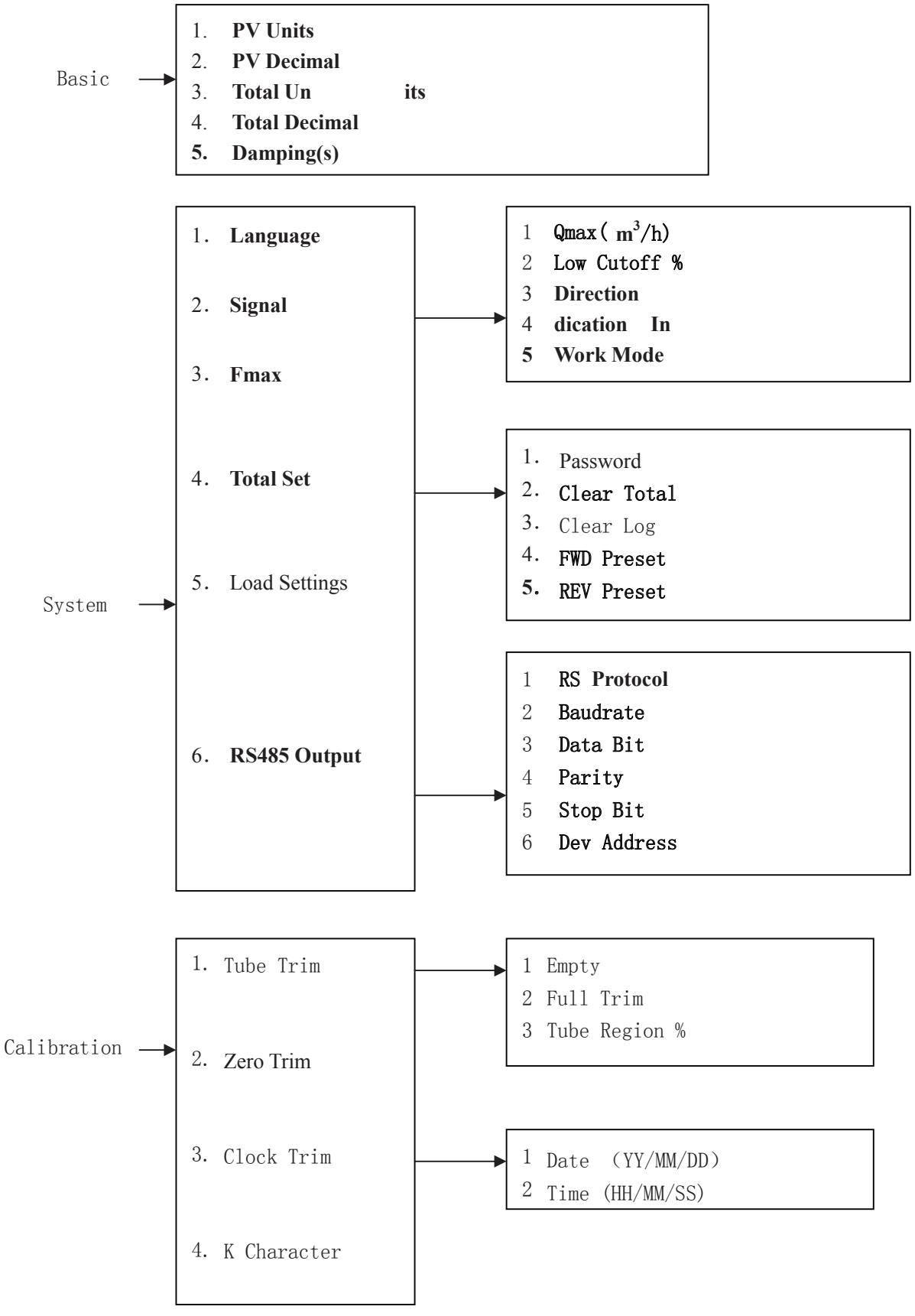
3.1 Schematic diagram of panel

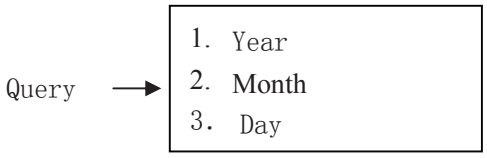


3. 2 Operation Key define


Confirm parameter and leave sub user menu
Down to next settings or Data variables Descending
Up to last settings or Data variables increasing
Right to parameter setup key, data "right move "key,
Shortcut keys and combinations key
888.8 L/S
Σ+ 8888888.8 m³
0.00m/s!
Fast speed system zero trim
Down to LCD display gray
Increase to LCD display gray
Increase or decrease LCD display contrast

3. 3 Menu tree directory struct





3. 4 Menu tree directory structure

(1) configure setup in measurement mode

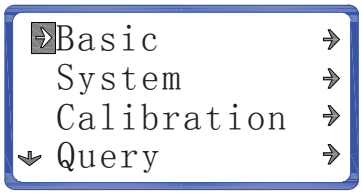
Click"->"key, LCD show below user interface, click"->" into menu

Basic

System

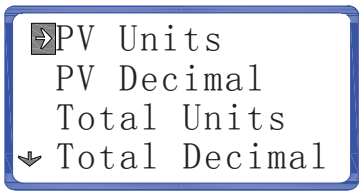
Calibration

Query



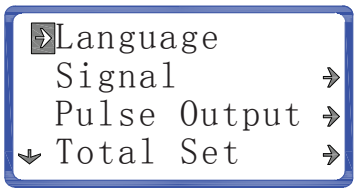
Basic

1. PV Units
2. PV Decimal
3. Total Units
4. Total Decimal
5. Damping(s)



System

1. Language
2. Signal
3. Pulse Output
4. Total Set
5. Load Settings
6. RS485 Output



Calibrati Calibrati

1. Tube Trim
2. Zero Trim
3. Clock Trim
4. K Character

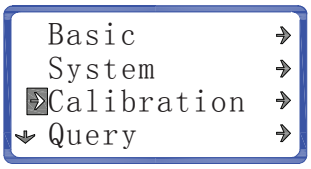
Query

1. Year
2. Month
3. Day

4. 2 “Zero Trimn Instrument calibration” processing

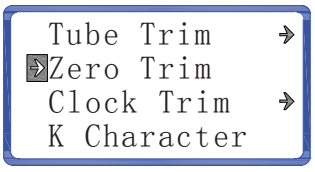
The same requesting with Fast Zero trim to ensure full static medium in tube， first enter “Calibration “item “Zero trim “menu.

（1）click“→”Key， LCD show this interface:



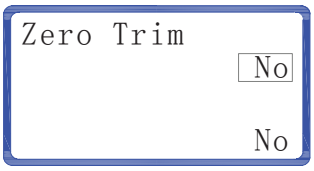
（2）

click“↓”Key. To move Cursor to“Calibration” item， click“→” Key again into “Calibration” menu，As figure show:



（3）

click“→”Key again， LCD show this interface

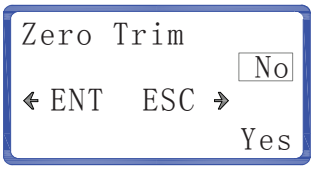


（4）

click“→”Key or“↓、 ↑”Key， Pls option Zero trim item to yes； as figure

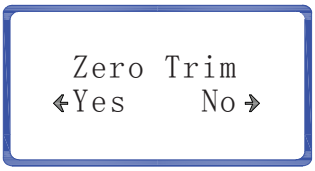
（5）

Now click“←”Key， Now into Zero Trim confirm interface，if click“→”Key，ESC Zero Trim states；



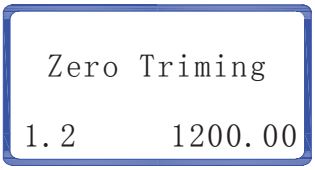
（6）

If click“←”Key， Now into Zero Trim, click“←”Key to run Zero Trim， click“→”Key ESC Zero Trim state；



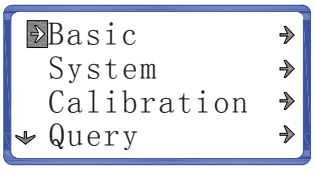
（7）

Run Zero Trim， As show the below figure end of Zero trimming,, the converter will return measurement mode automatically.

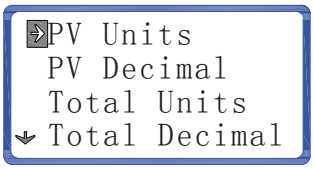


4. 3 PV unit Changing

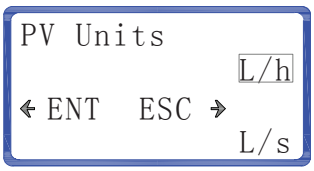
（A） Click“→”Key 1 time
LCD show this interface



（B） Click“→”Key again
LCD show this interface

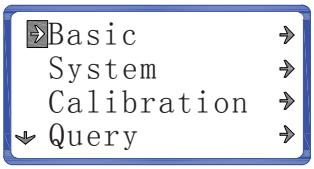


（C） Click“→”Key 1 time again
LCD show this interface
use “→”or “↓、↑”Key
to option “PV unit”， Click
“←”Key to confirm after
option unit， It will show
confirm menu again， as the figure
Click “→ ”Key again，
Confirm and ESC ；
If Click“ →”Key，ESC “PV UNIT” Changing.

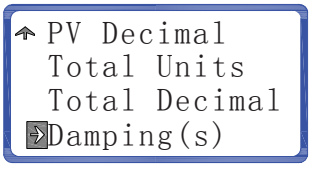


4. 4 Damping(s) Changing

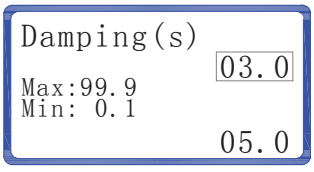
（A） Click“→”Key1 time
LCD show this interface



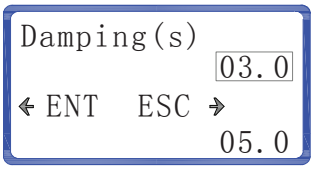
（B） Click“↓”Key again to
Damping(s) side
As figure show



（C） Click“→”Key again
LCD show this interface
use “→”Key move Cursor，
use“↓or ↑”Key inputti me of



Damping(s)， end data input, click
“←” Key again， LCD will show
confirm interface again， As below
Figure

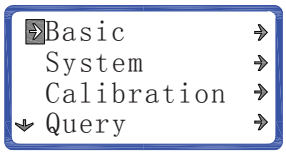


If Click“→”Key again，confirm and ESC; if Click“→” Key， ESC Damping(S) changing 。

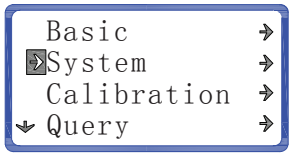
4．5 SCALE FLOW m³/h Qmax （m³/h）

“SCALE FLOW Qmax（m3/h）” Refers to the flow to reach the set value, the current output 20mA, frequency outputi s "output frequency" settings

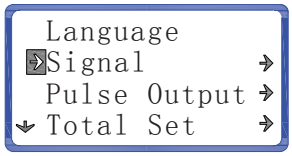
（1）In Measurement mode or Calibration Mode ,Click“→”Key， LCD show below interface



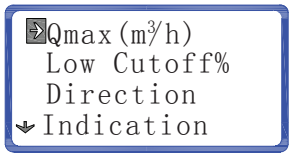
（2）Click“↓”Key move Cursor to System item ， As below figure



（3）Click “→” Key into System interface ，
Click“↓”Key move Cursor to “Signal”item， As below figure

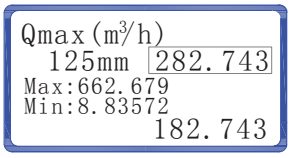


（4）Click“→”Key intosignalsub-menu interface，As below figure

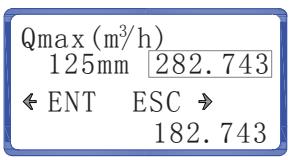


（5） Click“→”Key at Qmax(m3/h) item intoSCALE FLOW Qmaxmenu ， As below figure

use“→”Key move Cursor place， click“↓or ↑”Key
input SCALE FLOW data， end ofi nputting,
click “↵”Key to confirm. Now display parameter
Changing confirm menu.， As below figure。



（6）If Click“ ← ”Key to confirm parameter
changing
Click“→”Keyto cancel prameter changing



Note： Before SCALE FLOW data input， pls optioi calibe first。SCALE FLOW unit： m³/h。

“SCALE FLOW Qmax（m3/h）” Refers to the flow to reach the set value , frequency outputi s "outputf requency" settings

5 The Menu Functions

5. 1 Basic Configuration

5. 1. 1 PV UNIT

Parameter type: Option

Default: m^3/h

Range: L/s L/m L/h m^3/s m^3/m
m^3/h G/s G /m G/h

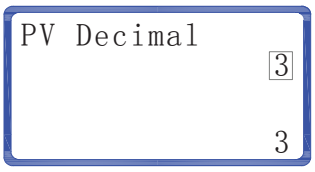
Click "→"Key option item，use"↓or ↑"Key select PV unit，end of setting up, Click "←"Key confirm and ESC。

5. 1. 2 PV Decimal

Parameter type: Option

Default: 1

Range: 1 2 3



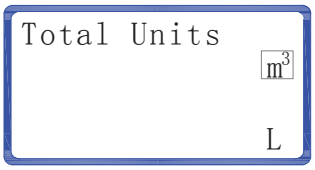
Use "→"Key to select setting item， use"↓or ↑"Key Option，end of setting, Click "←"Key confirm and ESC。

5. 1. 3 Total Unit

Parameter type: Option

Default: m^3

Range: L m^3 G



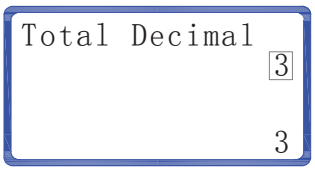
Use "→"Key to select setting item， use"↓or ↑"Key Option，end of setting, Click "←"Key confirm and ESC。

5. 1. 4 Total Decima

Parameter type: Option

Default: 3

Range: 1 2 3



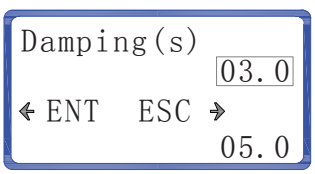
Use "→"Key to select setting item， use"↓or ↑"Key Option，end of setting, Click "←"Key confirm and ESC。

5. 1. 5 Damping(s)

Parameter type: Fixed-point decima

Default: 1.0

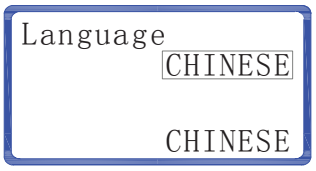
Range: 99.9 – 0.1



Use "→"Key to select setting item , click "→"Key move Cursor, click"↓or ↑"Key to input Damping(s), end of setting, Click "←"Key confirm and ESC。

5. 2 SYSTEM

5. 2. 1 LANGUAGE

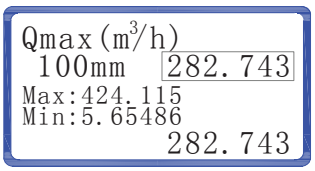


Parameter type: Option
Default: CHINESE
Range: CHINESE ENGLISH

Use "→"Key to select setting item , use"↓or ↑"Key Option, end of setting, Click "←"Key confirm and ESC

5. 2. 2 signal

5. 2. 2. 1 SCALE FLOW m^3/h Qmax (m^3/h)

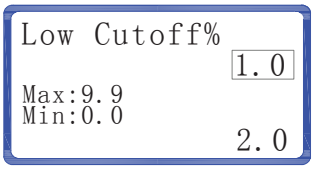


Parameter type: Floatng-point decima
DEFAULT: 100.0
Range: m – n

SCALE FLOW up limited m: The current Size 15m / s velocity
SCALE FLOW down limited n: The current Size 0.1m / s flow rate
m = (D*D) / 23.6 D—Size(mm)
n = (D*D) / 3540.0

"SCALE FLOW Qmax (m3 /h)" Refers to the flow to reach the set value , frequency output is frequency" settir; Change the parameter will affect Frequency out

5. 2. 2. 2 Low Cutoff %



Parameter type: Fixed-point decima
DEFAULT: 0.0
Range: 9.9 – 0.0
Example: if SCALE FLOW=100m3/h
Low cutoff =1.0%
then: As instantf low <1m3/h will be cut off

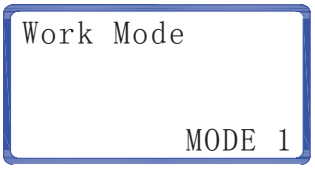
5. 2. 2. 3 Direction

Parameter type: Option
DEFAULT: Forward
Range: Forward Reverse Bi-direction
As setting is Forward, Reverse Flow can't be show and measurement.
As setting is Bi-direction, All direction flow data will be measurement and show.

5. 2. 2. 4 Indication

Parameter type: Option
DEFAULT: Forward
Range: Forward Reverse
As setting is Forward, Reverse Flow will be measurement and show forward,
As setting is Reverse, Forward Flow will be measurement and show Reverse

5. 2. 2. 5 Work Mode



Parameter type: Option

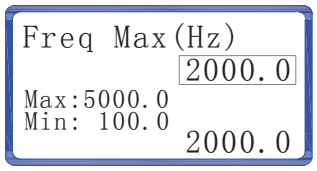
DEFAULT: 2

Range: 0 2 5 10 15

Ift he Parameter setup 0, Flow meter working is in standard Measurement mode，Iti s similar with regular electromagnetic flow meter Base on power supply，when parameter be setup 2, it means measurement need 2s sleep mode,5,10,15 also same function for sleep mode.

5. 2. 3 Freq Output

5. 2. 3. 1 Freq Max （Hz）



Parameter type: Fixed-point decimal

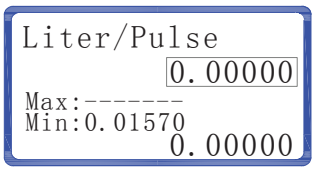
DEFAULT: 2000.0

Range: 5000.0 – 100.0

When Qmax is corresponding outputf requency

Output Freq(Hz) = (Currentf low(m3/h)/Qmax(m3/h))*Freq Max(Hz)

5. 2. 3. 2L/P Liter/Pul



Parameter type: Floatin-point decimal

DEFAULT: 0.0

Range: m – 0.00555

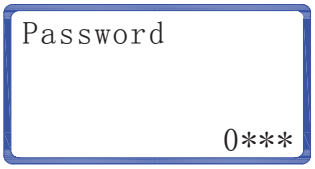
$$\text{Output Freq (Hz)} = \frac{\text{Current Flow (m3/h) / 3.6}}{\text{Pulse equivalent (L/P)}} = \frac{\text{Currentf low (L/s)}}{\text{pulse equivalent (L/P)}}$$

The flow meter Freq OutputRange i:: 10000.0 - 0.006Hz If the freq more than thRange, it will l output MAX value.

As pulse equivaler = 0.0,then" Freq MaxHz" to define Freq Outp

As pulse equivalent >0, then" pulse equivaL/P' to define Freq Output

5. 2. 5 Accumulated Management

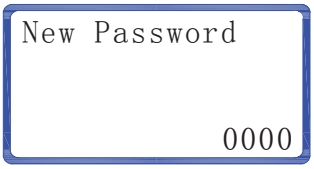


Enter Accumulated Management to need password

Factory default password: 0020

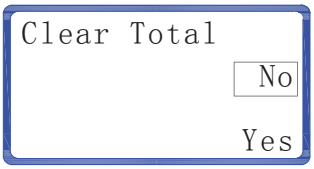
After entering you can change the new password for the next en

Warning: New Password changes should be in mind, otherwise customer cannot intohe item again



Above functional is optional, s converters don' t have this function.

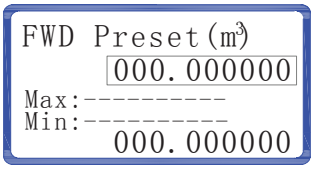
5. 2. 5. 1 Clear Total



Parameter type: Option
DEFAULT: No
Range: No Yes
Make Forward、Reverse Total clear to zero

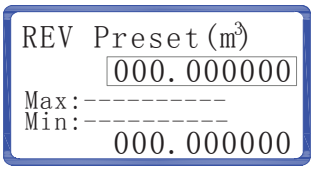
5. 2. 5. 2 FWD Pr eset

Parameter type: digital
DEFAULT: 0000000000
Range: 1-9999999999



5. 2. 5. 3 REV Preset

Parameter type: digital
DEFAULT: 0000000000
Range: 1-9999999999



5. 2. 5. 4 Load settings

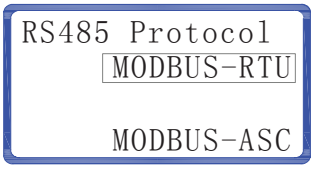
Parameter type: Option
DEFAULT: No
Range: No Yes

IfOption YES to restore factory ameter setting, then the meter forced reset. The flowmeter will reset by factory setti

5. 2. 4 RS485 Output

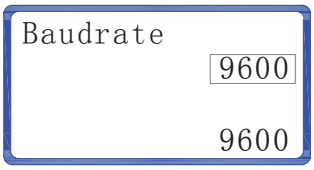
5. 2. 4. 1 RS485 Protocol

Parameter type: Option
DEFAULT: RTU
Range: RTU、ASC



5. 2. 4. 2 Baud rate

Parameter type: Option
DEFAULT: 9600
Range: 1200 2400 4800 9600



5. 2. 4. 3 Data Bi

Parameter type: Option
DEFAULT: 8
Range: 7 8

5. 2. 4. 4 Parity

Parameter type: Option
DEFAULT: None
Range: None/ odd / even

5. 2. 4. 5 Stop Bi

Parameter type: Option

DEFAULT: None

Range: 1 2

5. 2. 4. 6 Dev Address

Parameter type: digit

DEFAULT: 001

Range: 999 – 001

5. 3 Calibrati

5. 3. Tube of Full and EMPTY Trim

5. 3. 1. 1 Empty TRIM

Parameter type: Option

DEFAULT: No

Range: No Yes

Enter this item to confirm tube in empty, the function will be record empty tube characteristic value.

5. 3. 1. 1 Full TRIM

Parameter type: Option

DEFAULT: No

Range: No Yes

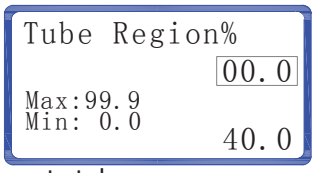
Enter this item to confirm tube in full, the function will be record full tube characteristic value.

5. 3. 2. 2 Tube Region %

Parameter type: Fixed-point decima

DEFAULT: 0.0

Range: 99.9—0.0



Tube Region %, the bigger value to the more sensitive detection of empty tube.

5. 3. 2 Zero TRIM

Parameter type: Option

DEFAULT: No

Range: No Yes

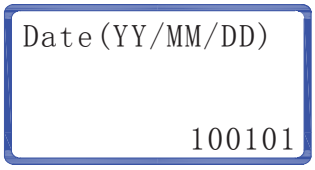
Confirmation measuring tube is full oft ubes and the fluid in a static state,

After system preheating, perform this function, then the automatic zero calibration instruments

5. 3. 3 Clock Tri

5. 3. 3. 1 Date

Parameter type: Fixed-point dat



DEFAULT： 000000

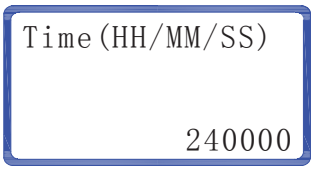
Range： 000000

5. 3. 3. 2 Time

Parameter type： Fixed-point dat

DEFAULT： 000000

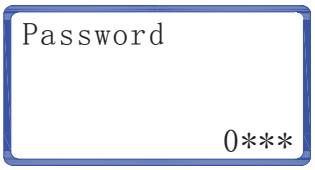
Range： 000000



5. 3. 4 K Characte

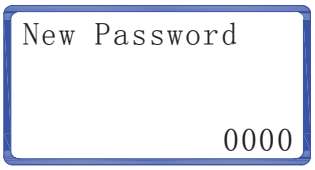
Enter K characte" to need password

Factory default password: 0003



After entering you can change the new password for the next en

Warning: New Password changes should be in mind, otherwise custome cannot into the item agai



Above functional is optional, s

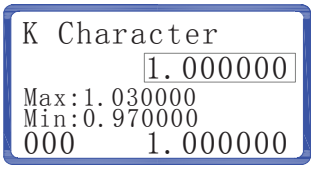
Converters don't have this func

K Characte

Parameter type： Fixed-point decimal

DEFAULT： 1.0000

Range： 0.970000 ~ 1.030000



This parameter indicated that the characteristics of flow meter instrument coefficient va default value is

Description: This parameter is used to instrumentt he second periodic verification; when the test results of ultra-poor, through adjust parameter values and parameter number will be recorded.

Instrument Coefficient: K character = 1 - was seized from the relative error values.

6 Sel-diagnostic information and troubleshoo

Electromagnetic floconverters hav sel-diagnostic feature Except to the power and hardware circuit failure, the general application of the fault can the correct alar informatio. This information is given in the lower right corner displays the app prompts.

Troubleshootin

1) No displa

a) Check the power supply is connecte or not;

b) Check the supply voltage to meet the requireme or not;

If these arright connecte, pleasmail theconverterto productiorfactor maintenance.

2) Excitation Ala

a) Excitatiwiring X andY is oper or not;

b) Check the value oresistance of excitation if have problem then the converter fault;

3) Empty Tube Alarm

a) Whether the fluimedium fillewith sensor tube

b) Use a wire to shor-circuiconverter signalput terminals , B, and Cat this time if t "Empty Alarm" warning" prompt withdrawal, indicating converno problem, there may be low conductivity of thflui medium or Empty tube threshold value and thEmpty tube range setting err

c) Check the signawire connection is corre

d) Check the sensor electrode correct or nc:

4) Measurement flow is not accura

a) Fluid is filled with sensors measurin or not;

b) Signa wire connection iright or nc;

c) Check the sensor coefficient, the sensor's zeit is right or not accordfactory calibration setti

Maintenance, repai

(1)Sensor installation sites should meet the requirements of section IV, and to main shel clean and tid

(2) Theconvertemust be placed in clean, ventilated, drye.

(3)I needs to reviewcalibrati once every two years,forthe high ccuracy requirement of users need mail meter to factory claibira

11, transport, stor

(1) The instrument must be pr-packing the transportation process should be handledh care, no rough handlin

(2) The storage site must be dry, ventilated, to avoid the corrosive gas eros environment temperatureavoidtoo lower or too higler.

(3) The storage period advise to not more tl three years

12 open box and check

(1) Op en box shalldon't all gravity thumpto box itshouldbe pay attention not t damage the instrument.

(2) Check the contentaccordin packing list of items one by one to ch.

7、 Detailed Configurati- (instrument manufacturers to set) is notn to

the public

Descriptio

1. Flow meter should have good grounding to avoid the influence of external interfe so that the flow meter working stabil

2. Flow meter should be avoid to any of the wiring operation with power, in particul excitation signal line and the electrode signal lines, which make the circuit boa

3. Excitation frequency for Range: frequency 50Hz 1 / 4 and 1 / 2 (12.5Hz and 25Hz 60Hz frequency of 1 / 4 and 1 / 2; in principle, the sensors are suitabigh-frequency excitation modes (eg, 25Hz), it is better for flow meter Range wider applicat application measurement for the slurry, and a higher measurement accuracy and sta

4. Current value of the Range for z-voltage, in principle, maller the value of th voltage the better, and this voltage value is relation with the excitation freq excitation frequency higher means higher the value of this voltage; voltage large a to reflect the characteristics of the sensambly, small voltage means the sens excitation coil and electrodes as well as the magnetic circuit of high

5. Gain of the current system state: E-1606 series converter with the syst automatically converted Range feature, we recommend usinutomatic feature, which ca effectively ensure that the weaker the signal under measurement acy.

6. The current flow corresponding to the voltage value: the value of the voltage is in the sensor signal strength, the best state of 150mV elocity, velocity time limi 10m / s.

Recommendation :

1. Flowmeter calibration should be in reference to "The People's Republic of China metrological verification" electromagnetic flowmeter (-2007) standard fo examination

2. Preheatig is necessary before calibration, the time should be more than 15 mir while the fluid inside the tubes should be a corresponding movement of certain spee proposed medium flow Range at 20% -30% SCALE FLOW position, the significance of doir

to make the temperature of the linein sensorreaches equilibrium with the medium t
guaranteeflow meter accuracy

3. Flowmeter in thecalibratic should be the first choice of the "pulse frequency" a
output,based on a calibrati of this method imost accurate

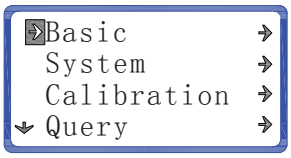
4. Recommended in the calibration setup Damping (s) betweer the 1s-3s, so that when
the higher stabil calibrati

.

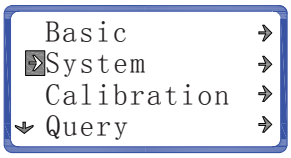
4. 3 scale flow m^3/h Qmax (m^3/h)

"Scale Flow Qmax (m^3/h)" refers to the flow to reach the set value, the frequency output is "output frequency" settings

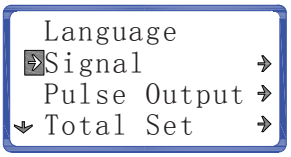
(1) In "measurement mode" or "calibration mode" to Click "→" key, show the below user interface



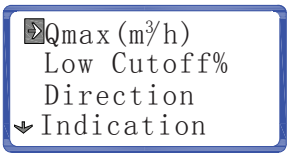
(2) Click "↓" key to move cursor "System" position, as the below figure



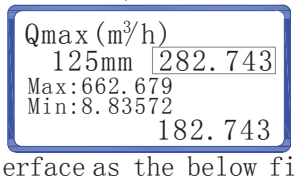
(3) Click "→" key, enter "System setting" user interface, Click "↓" key move cursor to " Signal" position, as the below figure



(4) Click "→" key, enter "signal " sub-menu user interface, as the below figure

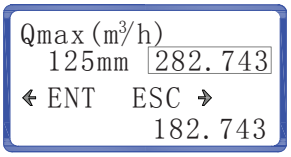


(5) At Qmax (m3/h)Click "→" key, enter "Qmax" setting user interface, as the below figure



use "→" key to move cursor, use "↓ or ↑" key to input Qmax data, end of inputting, Click "←" key to confirm, now show the modify parameter to confirm user interface as the below figure

(6) Now Click "←" key to confirm parameter changing
Click "→" key to cancel parameter modify and back to previous menu。



note: Before the Qmax inputting, it must first for "Size" setting. Qmax units: m3 / h。

"Scale Flow Qmax (m^3/h)" refers to the flow to reach the set value, the frequency

FLOWTECH ™

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